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INTERNAL FRAME STRUCTURE FOR REPEATER

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[There are no amendments to this patent.]

Claim

Internal frame structure for repeater characterized in that, in a repeater that is constituted so that an internal frame that has essentially a linear external form is housed in an outer casing with a part of the inside surface formed into a curved surface and so that the repeater components are mounted in said internal frame, T-shaped or L-shaped heat-transmitting fins, whose outer

surface have a shape that complements the inside surface of the aforementioned outer casing, are formed integrally with the internal frame on the outside surface of the aforementioned internal frame, and the internal frame can be housed in the outer casing with the outside surfaces of said heat-transmitting fins touching the inside surfaces of the outer casing.

Detailed explanation of the design

This design pertains to a communication system repeater. In particular it pertains to the internal frame structure of a land-based repeater.

Land-based repeaters are generally constituted so that an outer casing with a watertight structure is installed in an underground trench, one or more internal frames are housed in the outer casing, and the repeater components are mounted in the internal frame. However, in the prior art, the outer casing would have been formed by deep drawing sheet stock, stainless steel, for example, from the standpoint of watertightness and durability, so that the corners and reinforcing bead parts of the inside surfaces would have been formed into curved surfaces. On the other hand, the internal frame generally has a sheet metal structure and essentially a linear form. This results in the problem that during assembly, the angular corner parts of the internal frame abut the curved surfaces of the corner parts of the outer casing so that the internal frame is not held and housed stably. The heat generated during operation by the repeater must be transmitted to the outside from the internal frame through the outer casing. However, the outside surfaces of the internal frame and the inside surfaces of the outer casing are separated for the aforementioned reasons. Thus, there has been the problem that satisfactory heat transmission to the outer casing does not occur.

Therefore, the purpose of the present design is to provide an internal frame that can solve the aforementioned problems of the repeater that has a structure such as the one described above; that is, specifically, the purpose of the present design is to provide an internal frame that can be stably housed and held to provide satisfactory heat transmission to the outer casing.

The internal frame structure for the repeater based on the present design has T-shaped or L-shaped heat-transmitting fins, whose outer surfaces are shaped to complement the inside surfaces of the outer casing and are formed integrally with the internal frame on the outside surfaces of the internal frame. Furthermore, the internal frame can be housed in the outer casing so that the outside surfaces of the heat-transmitting fins make contact with the inside surfaces of the outer casing.

This design will be explained in detail below based on an application example with reference to the figures.

Figure 1 is a schematic plan view showing the constitution of an application example of a repeater based on this design. In the figure, reference numeral (1) represents the outer casing of

the repeater. Outer casing (1) is formed by deeply drawing sheet material, such as stainless steel, and corner part (2a) and reinforcing bead part (2b) of inside surface (2) are formed into curved surfaces. Although not shown here, the corners of the bottom of inside surface (2) are also in the form of curved surfaces like corner part (2a). Four internal frames (3) (-1, -2, -3, and -4) and one supplemental frame (4) are housed inside outer casing (1). Stub cable (5) is introduced into outer casing (1) through flange (6). The repeater components (not shown) are mounted in internal frames (3). Supplemental frame (4) is used to attach the ground line to stub cable (5).

All four internal frames (3) have the same structure. Basically they are rectangular elements with the linear shape shown in Figure 2. Five T-shaped or L-shaped heat transmitting fins (7) (-1, -2, -3, -4, and -5) are integrally formed on the outside surfaces of internal frames (3) (in the example shown, two of the four surfaces). The outside surfaces of heat-transmitting fins (7) have a shape that complements the inside surfaces of outer casing (1); that is, the outside surfaces of heat-transmitting fins (7) touch the inside surfaces (2) of the outer casing, as shown in Figure 1, when internal frames (3) are housed in outer casing (1). Internal frames (3) can be produced by extrusion molding a material that has good heat conduction, for example, aluminum.

Internal frames (3) are housed in corner part (2a) inside outer casing (1) as shown in Figure 1. Here, internal frames (3-1) and (3-3) are housed in the upper and lower positions shown in Figure 2 [sic; 1] and the other internal frames (3-2) and (3-4) are housed in the opposing upper and lower positions of Figure 2 [sic]. Then internal frames (3) are held by an appropriate fixing means, for example, screws, and/or an appropriate pressing means, e.g., springs, so that the outside surfaces of their heat-transmitting fins (7) touch the inside surfaces (2) of outer casing (1). Here, although not shown, a block, made of aluminum or the like, that is separate from internal frames (3) is housed below internal frames (3). The outside surface of this block is formed to complement the inside bottom surface of outer casing (1) and is constituted so that the two will be tight when the frame is housed.

Such an internal frame structure for this design has the following effects.

First, the outside surfaces of the heat-transmitting fins touch the inside surfaces of the outer casing, so the internal frames can be held and housed easily and reliably in the outer casing.

The heat-transmitting fins are also formed integrally with the internal frames, and touch the inside surfaces of the outer casing with their outside surfaces, so that satisfactory heat conduction characteristics are obtained from the internal frames to the outer casing.

In addition, it is possible to obtain outside surfaces with a large surface area, that is, a large heat conduction area, with T-shaped or L-shaped heat-transmitting fins, and this can further be accomplished with a small amount of material, so there is the advantage that the internal frames can be made lightweight.

Also, the internal frames can be easily produced by extrusion molding or the like. Particularly in the example shown, the four internal frames are the same, so that they can be produced by cutting one type of extrusion mold stock. Thus production cost is cheap. High dimensional precision can also be obtained by extrusion molding, and this is useful for realizing stable holding of the internal frames and high heat transmission characteristics.

With the present design as described above, it is possible to realize a repeater with many outstanding benefits.

Brief description of the figures

Figure 1 is a schematic cross section of an application example of a repeater based on the present design. Figure 2 is an oblique view of an internal frame.

(1) ... outer casing, (2) inside surface of outer casing, (2a) ... corner part of inside surface of outer casing, (3) (-1, -2, -3, -4) ... internal frame, (5) ... stub cable, (7) (-1, -2, -3, -4, -5) ... heat-transmitting fins.

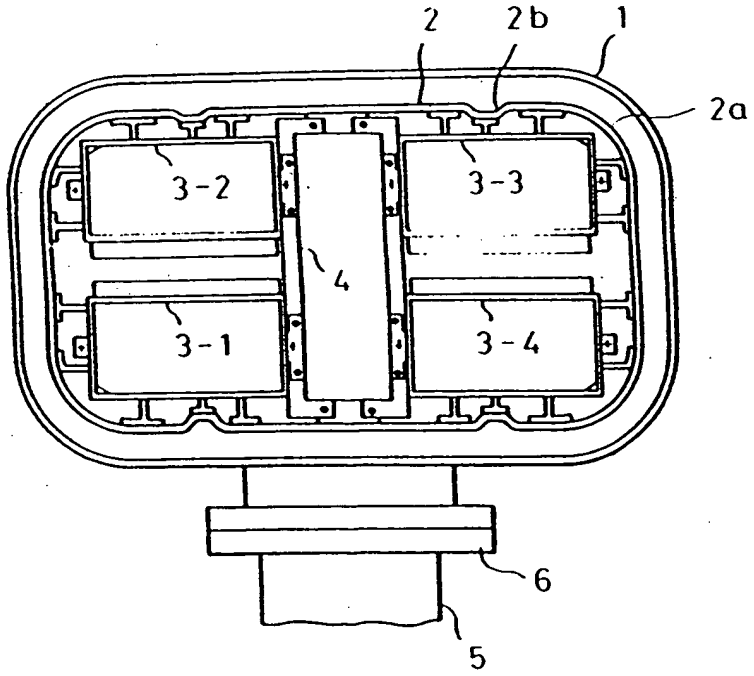

Figure 1

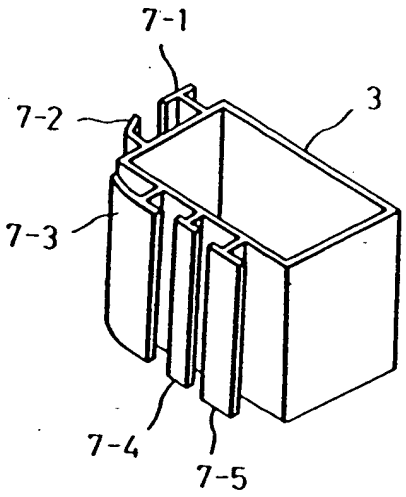

Figure 2